CloudTurbine: Streaming Data via Cloud File Sharing, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)
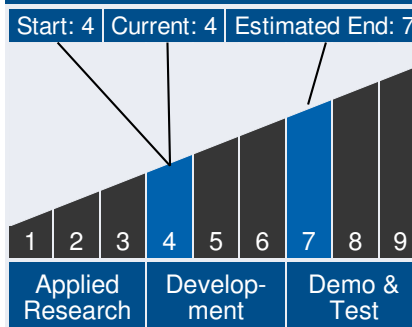
ABSTRACT

We propose a novel technology to leverage rapidly evolving cloud based infrastructure to improve time constrained situational awareness for real-time decision making. Our "CloudTurbine" innovation eliminates the distinction between files and streams. Streaming and static data have long been considered separately. Whereas streaming data protocols continue to fragment, a great unification of approach for static data has occurred. The paradigm for file-sharing services is simple: (1) put data in a local file folder, (2) it automatically shows up at other linked systems. Wouldn't it be nice if one could unify an approach for streaming data while leveraging the file-sharing cloud infrastructure? This is precisely what we propose. CloudTurbine is a streaming data interface to file-sharing and file-transport services such as Dropbox and FTP. It delegates much of the data transmittal, security, and server resources to the third-party service. It eliminates the distinction between files and streams, and enables a simple, cost effective new paradigm for streaming data middleware. Phase I demonstrated the features, utility, and performance of the prototype CloudTurbine to be very appropriate for a wide range of data-streaming applications. A significant performance issue is the inherent latency imposed by file bundling plus transfer time. Testing has proven this to be tractable, with low latency (2-5s) for several file sharing services, and very low latency (10-50ms) for protocols such as FTP and mapped drives. We propose an Open Source CloudTurbine web portal as a hub to provide this technology to NASA, scientific, and industrial communities. Following the legacy of the earlier-generation DataTurbine, we will vigorously move to establish a self-sustaining Open Source community which provides CloudTurbine access, development, services, spin-off products, and community support.

Table of Contents

Technology Maturity

Start: 4	Current: 4	Estimated End: 7

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

Management Team

Program Executives:
- Joseph Grant
- Laguduva Kubendran

Program Manager:
- Carlos Torrez

Continued on following page.

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ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: CloudTurbine would provide a significant advancement of the NASA "Virtual Presence" infrastructure for flight research data and wind tunnel test data remote collaboration. Other potential NASA applications include LVC-DE distributed flight simulation, SOFIA sensor data streaming to schools for educational outreach, and conversion of legacy flight data to a sustainable, transparent archive format. CloudTurbine is synergistic and compatible with the DataTurbine middleware and WebScan web viewer in use by NASA, and leverages the investment and utility of these legacy technologies. It brings new advantages and lowers the barriers to interfacing data at both source and consumer. Significantly, it brings the power and advantages of modern Cloud computing to streaming data for flight operations.

To the commercial space industry:

Potential Non-NASA Commercial Applications: Potential non-NASA applications include scientific sensor applications, a DataTurbine compatible enhancement for scientific researchers at http://dataturbine.org, smartphone photo/video sharing, and a new platform for the rapidly growing "Internet of Things" market to monitor home appliance, utility and energy use.

Management Team *(cont.)*

Principal Investigator:
- Matthew Miller

Technology Areas

Primary Technology Area:
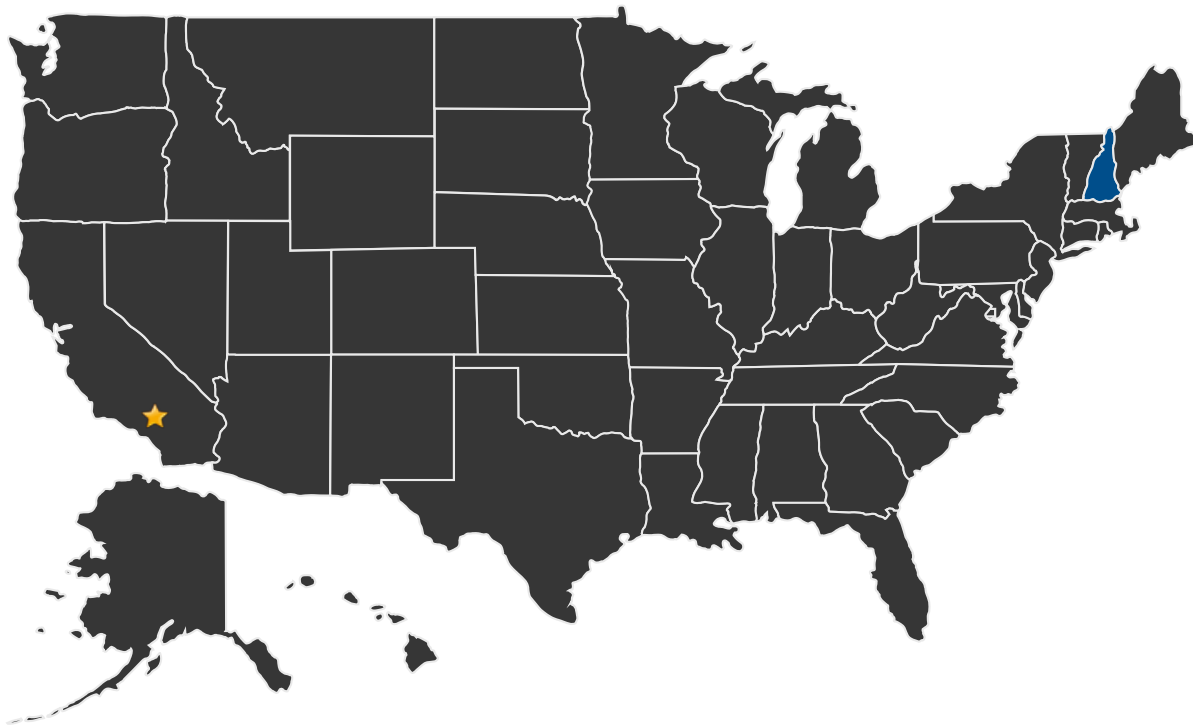Modeling, Simulation, Information Technology and Processing (TA 11)
└ Information Processing (TA 11.4)
   └ Collaborative Science and Engineering (TA 11.4.4)

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U.S. WORK LOCATIONS AND KEY PARTNERS

■ U.S. States With Work ⭐ **Lead Center:**
Armstrong Flight Research Center

Other Organizations Performing Work:

• Cycronix (Laconia, NH)

PROJECT LIBRARY

Presentations

• Briefing Chart
  ○ (http://techport.nasa.gov:80/file/23625)

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IMAGE GALLERY

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DETAILS FOR TECHNOLOGY 1

Technology Title

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Potential Applications

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